

**National Fire Plan
Research and Development Projects Funded
FY 2001**

TOPIC D (Communities): \$2,727,000 (out of \$3,000,000 planned)

**Development of Approaches to Enhance Forest Service-Public Joint Understanding, and
Consensus, on Fire Management Strategies**

RMRS-FTC-14 Di \$175,000

**Modeling people's responses to stand and landscape level treatments for preventing
wildfires and restoring fire-affected areas**

NC-2.5 Di \$400,000

**Community partnerships: Landscape level strategies to reduce the risk and loss from
catastrophic fires**

NC-4.1 Di \$487,000

Recreation and Fire in the Urban-Wildland Interface

PSW-4902-1 Di \$415,000

Preventing Residential Fire Disasters During Wildland-Urban Interface (W-UI) Fires

RMRS-MSO-19 Dii \$500,000

Alternative Prescriptions for Firewise Residential Landscapes

PSW-4952-1 Dii \$500,000

**The Development, Status, and Impact of Voluntary and Regulatory Fire Protection
Programs in Wildlands Experiencing Residential Expansion**

SRS-4802-4 Dii \$250,000

Station: **RMRS**

Proposal code: **RMRS-FTC-14**

Topic(s): **D-i**

Proposal title: *Development of Approaches to Enhance Forest Service-Public Joint Understanding, and Consensus, on Fire Management Strategies*

Other proposals to which this is linked: RMRS-FTC-12, FTC-15

RWU and location(s): **RWU-4852**

Description:

- **Research or development question, issue, or need:** According to the National's Fire Plan and the FS GPRA draft strategic plan, it is important to actively include the public in the agency's decision-making process. Both documents call for improved communication with and active participation by the public. Public acceptance of the FS actions is critical to developing successful programs. This implies a need for approaches that assess (and influence) public perceptions and attitudes toward fire management activities; that will facilitate the development of techniques for working with communities; and that will result in the development of improved strategies for minimizing controversy over restoration projects. We propose three studies, related to the role of information in working with the public. Our premise is that in an ideal situation, information flows in two directions. Both parties need to hear and understand what the other is saying in order for true collaboration to occur. Each study addresses a facet of this ideal communications model and all three will integrate results from our past work.

- **Research and development approach:** Study One: This study will be designed to measure the effect that additional information has on the preferences of the public. Photographs will be used to evaluate tradeoffs between different ecosystem conditions, by asking a selected group of stakeholders, which picture corresponds to a more desirable ecosystem end-state. Then these individuals will take a field trip to selected sites to examine forest ecosystems that have been exposed to various types of disturbance. Following this tour the participants will be given another similar photo survey and asked the same questions about the pair-wise tradeoffs. Statistical analysis will be conducted to determine if information from the tour had any impact on the participant's concept of a desirable end-state. The methodology utilized should provide a very positive tool for local managers in communicating management options to a local community and this study is designed to verify this.

Study Two: One important aspect of "Forest Service manager to public" interaction is the communication of risk. Each ecosystem treatment option (selective harvesting, controlled burn, a combination, etc.) has associated risks that are measured through 'risk assessment' and then are controlled through 'risk management' activities. However, an often overlooked area of community acceptance of selected treatment options is 'risk communication' and the public's understanding of the tradeoffs that exist in selecting a particular option. This study will investigate ways of communicating information on potential risks and ways of managing for their mitigation. It will involve the evaluation of selected stakeholder's levels of knowledge and their attitudes/preferences toward various

treatment options for obtaining a particular end-state for the forest ecosystem. We will determine what selected stakeholder groups know concerning various possible end-states and treatment options. Using this knowledge as a baseline, we can determine how much calibration linkage between what consumers know and what they think they know needs to occur to ensure that the public is correctly informed of risks, etc. through various 'risk communication' schemes that will be tested for effectiveness.

Study Three: Determining *ex ante* how society will accept a particular treatment option designed to achieve a particular ecosystem end-state requires conveying technical information in an understandable manner (study two). Once the public understands this information, it is then necessary to determine their preferences regarding the desired ecosystem end-state, and the various approaches to achieving it. Conjoint analysis will be used to evaluate preferences by decomposing the attributes of a particular ecosystem end-state and evaluating the importance of each attribute to the individual. This approach is appropriate because it can be used to identify the tradeoffs that the public sees as acceptable in determining the desirable end-state of the ecosystem. Various end-states will be identified, each with a different set of attributes, that will permit us to determine which attributes are important in determining the desirable end-state. Stakeholders will be surveyed both in order to determine the desired end-state for the ecosystem and to establish their preferences regarding various implementation techniques available to achieve the desired end-state

- **Outcomes or products:.**
- **First year: Study One:** complete study and develop workshop for FS personnel on how to use this approach in working with public. **Study Two:** conduct in-depth interviews to construct baseline data on knowledge related to what public thinks it knows vs. what they actually know about forest management practices. **Study Three:** develop attributes list for conjoint analysis
- **Second year. Study One:** prepare scientific papers on study results. Refine and conduct the workshop for FS personnel. **Study Two:** complete analysis of site-specific study and prepare handbook on risk communication for FS personnel. **Study Three:** develop survey and conduct interviews to determine trade-offs for the conjoint analysis.
Three to Five years out: Complete analysis of data for all studies and prepare scientific papers. Complete the work on 'generalizing' results beyond site-specific examples used for the studies. Develop additional handbooks/workshops on working with public.

Staffing needs by series and grade: **Existing Workforce: 1/3 SY Res. For.– Brian Kent**

Description of skills required: **Decision Sciences Modeling, Multivariate Statistical Analyses**

Potential Partners: **CO. Sc Mines, CO. NF's, CO. State For Ser., U of CO., RWU-4851**

Funding requested: **\$175,000/year**

Team Leader: **Brian Kent**

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Station: North Central Research Station

Proposal code: NC-2.5

Topic(s): B-i Restoring landscapes and rebuilding communities, post-fire treatments; C-i Reducing hazardous fuels and fire risk, assessment, C-iii Reducing hazardous fuels and fire risk, treatments; D-i Working with communities, social and economic systems.

Proposal title: Modeling people's responses to stand and landscape level treatments for preventing wildfires and restoring fire-affected areas.

Other proposals to which this is linked (Proposal code): NC- 2.1, 2.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3, 2.4, 4.1.

Research Work Units): RWU NC-4902 Natural Environments for Urban Populations, Chicago, IL; RWU NC-4803 Social and Economic Dimensions of Ecosystem Management, St. Paul, MN; RWU NC-4101 Northern Forest Silviculture, and NC 4351 Ecology and Management of Riparian Aquatic Systems, Grand Rapids, MN; RWU NC-4154 Central Hardwood Silviculture and Ecology, Columbia, MO..

Description: Research or Development, Question, Issue, or Need: The purpose of this research is to evaluate public response to fire management treatments—particularly fuel reduction and restoration—across a range of social and biophysical settings. This research is urgently needed so that land managers can choose communication and treatment strategies more wisely, and so they can help reduce controversies and strengthen constituencies for fire management treatments. A significant body of research on people's perceptions of forest harvesting alternatives and responses to restoration activities (much of it conducted by NC-4902 and its partners) suggests the possibility of both positive and negative public reactions under certain circumstances, yet little work has focused directly on the issues of expanded treatments to reduce fuel loads or restore burned areas. Existing models of people's responses to forest management and restoration provide some guidance for assessing fire treatments at the stand level, but new techniques and methods are needed to assess perceptions of temporal and spatial impacts at the landscape level. There could also be considerable variation between individuals in how different fire management treatments are evaluated depending upon where they live, particularly in relation to their proximity to the urban/wildland interface; their knowledge of wildland fire; and their perceptions of risk.

Research and Development Approach: The research will be built around three key situations relating to expanded treatments for fire management: 1) treatments to reduce fire risk from fuel loading, such as conditions resulting from the recent blowdown in and around the Boundary Waters Canoe Area Wilderness; 2) treatments to restore ecosystems where wildfire has already occurred, such as areas in the North Central region and western U.S. that have recently burned; and 3) treatments to restore the health of fire-dependent ecosystems, such as oak savanna and pine barren forest types. In the first phase of this work, stand-level predictive models will be developed for each situation to assess public

perceptions of aesthetic impact and the social acceptability of treatments. Individuals will be asked to evaluate treatments through the use of slides or videotape of the areas, with computer video imaging used to simulate typical future treatment scenarios. Separate models will be developed to assess potential differences in perceptions among different stakeholder groups, including urban/wildland interface residents, visitors, and private timber producers. Individuals' knowledge of fire and fire risk will also be assessed, as will their attitudes toward fire management practices. In the second phase of the research, this quantitative information will be used along with qualitative information obtained through focus groups and simulation/gaming technology to develop scenarios for assessing the social acceptability of different treatments as they are applied at the landscape level and over time. This information will provide a social layer of information that can link with spatial-temporal information on silvicultural/fuels treatments from models such as LANDIS and NORTHWDS.

Outcomes or products:

First year: Fire managers will have improved understanding of public responses to actual and proposed fuel reduction and restoration efforts in the North Central Region and selected areas nationally as a result of initial studies conducted under this effort.

Second year: Fire managers will have new insights into the aesthetic impact and social acceptability of treatments given various physical, social, and fire risk conditions. These insights will be based, in part, on stand-level predictive models. Fire managers will have preliminary strategies for dialogue with the public over fuel reduction and restoration strategies in the North Central Region, and critical areas around the U.S.

Three to five years out: Managers will be able to predict the acceptability of treatments at the landscape scale through linkages with spatial and temporal information generated by LANDIS and NORTHWDS models. Managers will have access to final strategies and guidelines for public dialogue. A Web-based interactive program based on the study models will illustrate the effects of different treatments on judgments of aesthetic impact and social acceptability.

Staffing needs: 1 Research Social Scientist (GS-101-12/13), 2 RJVA's, and technical support for field work and simulations.

Description of skills required: Environmental psychologist with experience modeling and explaining people's responses to stand/landscape treatments. It will be critical that this individual is able to work on inter-disciplinary teams.

Potential Partners: The work will be carried out in consultation and partnership with an extensive network of research partners around the U.S. and internationally who have worked with us on stand/landscape perception projects dealing with timber harvesting, insect infestations, fire (very few instances), and other disruptions. This network includes Dr. Terry Daniel at the University of Arizona, Dr. James Palmer at the State University of New York at Syracuse, Dr. Robert Ribe at the University of Oregon, Dr. Bruce Hull at

Virginia Tech, Professor Brian Orland at Penn State University, Professor Joan Nassauer at the University of Michigan, Dr. Stephen Sheppard at the University of British Columbia, Dr. Eckart Lange at the Swiss Federal Institute of Technology, and Dr. Ian Bishop at the University of Melbourne.

Funding requested: \$400,000 per year

Leveraging: This research will build upon a joint venture research agreement established in 1999 with Dr. Terry Daniel at the University of Arizona (\$90,000) that looks at perceptions of ecological management techniques, and upon efforts being planned by a consortium of researchers headed by Dr. Stephen Sheppard at the University of British Columbia that is examining the links between aesthetic and sustainability values. This work will further to contribute to priority objectives established by the NCRS's Forest Productivity Integrated Program.

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Station: **North Central Research Station**

Proposal code: NC-4.1

Topics: **B-i Restoring landscapes and rebuilding communities, post-fire treatments; C-i Reducing hazardous fuels and fire risk; and D-i Working with communities, social and economic sys**

Proposal title: Community partnerships: Landscape level strategies to reduce the risk and loss from catastrophic fires

Other proposals to which this is linked (Proposal code): Although not directly linked to National Fire Plan Proposals, this research is linked to the North Central Landscape Change Integrated Program

Research Work Units: RWU NC-4803, Social and Economic Dimensions of Ecosystem Management, St. Paul, MN; and RWU NC-4902, Managing Forest Environments for Urban Populations, Evanston, IL.

Description: Research or Development, Question, Issue, or Need: This project will result in new strategies to help communities be proactive in developing partnerships with neighboring communities, agencies, and others to decrease their vulnerability to catastrophic fire.

The vulnerability of communities at the wildland urban interface to natural disasters such as catastrophic fire is a function of the community's resiliency, institutional capacity, and cultural norms. In addition to these community characteristics, there are factors acting from outside the community that may limit its ability to prepare for or manage catastrophic fire. One set of factors relate to ecological conditions occurring on the landscape in which the community is located. These landscape conditions are critical in determining the vulnerability of communities at the wildland urban interface. Another set of factors includes regulations at the neighborhood, city, state and federal level that mandate land use or vegetative conditions that may act against a community's efforts to minimize the impacts of fire. For example, vegetation management recommended to increase water yield may increase fire risk. Finally, various factors have an impact on a community's ability to coordinate disaster preparedness with neighboring communities and with county, state or federal agencies. Organizational culture, institutional style, and the strength and nature of horizontal and vertical ties within and between communities and agencies can all have an impact on successful preparedness planning. For instance, some organizational cultures may actually discourage community participation in fire management activities.

Scientists at the North Central Research Station have worked with communities throughout the Lake States, evaluating their ties to the forests of the region and their dependency on the national forests. Research on communities has included the American

Indian communities of the region, with consideration of the special relationships of the tribes to the federal lands. We have also studied the role of seasonal residents in the sustainability of rural communities. Seasonal residents have played a major role in expanding the wildland urban interface. North Central scientists are also committed to addressing priority research questions identified in the Station's integrated research programs. For the Landscape Change and Forest Productivity integrated programs in particular, the impacts of fire are of great interest.

By partnering with social scientists in other regions we can expand the applicability of our findings. We will work with scientists at the Pacific Northwest Station, building on their research on organizing communities to conduct and participate in community assessments and social impact analyses. By working with partners at the University of Florida we can facilitate their efforts to aid communities in their recovery from 1998 catastrophic wildfires in Florida.

In our own region, communities look to what has occurred in terms of catastrophic fires in the south and west, and realize that it can happen here. Some north central communities have initiated efforts to organize for and manage wildland fires. Cooperation with the Northwest Regional Planning Commission will allow us to tie into the landscape-level planning being done in northwestern Wisconsin, where the presence of high risk fire ecosystems and fragmented forest ownership have resulted in an identification of fire preparedness as a top priority planning issue.

Research and Development Approach: In the first phase of this research we will identify communities who have been successful in developing programs that prepare the community for natural disasters, or facilitate management of conditions to minimize the impacts of these disasters. We will look not only at community programs related to fire management, but programs developed to respond to a range of natural disasters that may have relevance to fire management. We will also evaluate any natural resource management activities, such as ecosystem restoration, that have implications to fire management. Through key informant interviews and focus groups we will determine the factors that were critical to the success of these programs. In addition to the factors mentioned above, we are interested in how individuals are mobilized to take collective action, how partnerships are formed between communities or between communities and agencies or other organizations, and the role of landscape in a community's disaster management program. In phase two we will use the information gained from the case studies to develop an instrument to query residents of other communities who have experienced catastrophic fire. The purpose of contacting this second larger group is to test the universality of the factors identified in the successful programs. In phase three we will develop a typology of communities and landscapes based on factors found critical to the success of strategies aimed at minimizing the loss to catastrophic fires. Finally, we will develop models of cooperation and partnership that promise to increase the effectiveness of fire management programs for different types of communities and landscapes.

Outcomes or products:

First year: Identify communities for study, and develop protocol for collecting information from these successful communities. Establish research joint ventures with partners.

Second year: Complete case studies and develop protocol for testing information from the case studies with residents of other communities who have experienced fire.

Three to five years out: Develop typology of communities and landscapes, and models of cooperation and partnership that will increase the effectiveness of fire management programs.

Staffing needs: Interdisciplinary position, geo-spatial analyst, GS 09/11

Description of skills required: We will hire someone who can conduct statistical analyses based on the physical location of spatial entities (for example, communities, national forests, ecosystems) in a landscape. These skills are critical to identifying shared and unique characteristics of communities relevant to fire management within an ecosystem.

Potential partners: Dr. Linda Kruger, USDA Forest Service, Pacific Northwest Research Station, Seattle, WA; Dr. Martha Monroe, University of Florida, Gainesville, FL; Dr. Jan Hacker, Northwest Regional Planning Commission, Hayward, WI.

Funding requested: \$487,500 for 2 research joint ventures (one in south and one in the west) and one technician

Leveraging: Builds on previous work with forest dependent communities and seasonal residence in the region.

Team leader: **Pamela J. Jakes**

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Station: **Pacific Southwest Research Station (PSW)**

Proposal Code: **PSW-4902-1**

Topic: **D-i**

Proposal Title: **Recreation & Fire in the Wildland-Urban Interface**

Other Proposals to which this is Linked: **PSW-4402-10**

RWU: **PSW-4902, Wildland Recreation and Urban Cultures, Riverside, CA**

Description:

Research or Development Question, Issue, or Need: **Fire events often have a large impact on recreation and tourism, yet these issues are not currently being addressed from a social science perspective. These impacts are due to the direct short and long-term biophysical effects of fires, and indirect or induced effects due to fire operations, fuel treatments, area closures and other disruptions to human systems. Local populations are affected, as are visiting populations. And these effects are particularly acute in wildland areas near urban areas. Understanding and managing these impacts will be improved by scientific study of the values, attitudes, beliefs and behaviors of the affected populations in relation to fire events, fire management and fire effects.**

- **Examine values/ attitudes & behaviors of recreation residence owners and year-round residents in the wildland-urban interface.**
- **Examine recreationists' perceptions about fire management, including prescribed fire and fuel treatments as well as fire suppression and post-fire forest health issues.**
- **Examine perceptions and beliefs about recreation activities and impacts to fire-prone ecosystems in the wildland-urban interface.**

Research and Development Approach: **Conduct qualitative studies among key user groups and stakeholders, including focus groups and interviews with opinion leaders. Conduct field observations. Prepare, pretest and conduct mailed surveys of recreationists and tourists (users).**

Outcome or Products:

First Year: **Hire staff. Conduct background studies (literature reviews, etc.). Identify key research locales. Meet with agency staff responsible for fire and recreational uses and prepare study plans. Prepare and pretest survey instruments, garner OMB approval, obtain community contacts.**

Second Year: **Refine study plans. Begin user-focused data collection, conduct interviews with opinion leaders, and conduct focus group meetings with communities of interest and communities of place.**

Three to Five Years Out: **On-going tourist and recreationist data collection, data analyses. Write reports and initiate technology transfer to community and agency members.**

Staffing Needs: **(1) Research Social Scientist, GS-101-12/13, (2) Social Science Analyst, GS-101-9, (3) Social Science Technician, GS-102-7**

Description of Skills Required: **(1) Research Social Scientist will need to have Ph.D. in social science-related field and experience with conducting research in urban and rural communities. (2) Social Science Analyst will have a MA/MS degree in social science-related field and experience with overseeing data collection, data entry, and analyses. (3) Social Science Technician will have BA/BS degree in social science-related field and experience with social science data collection, data coding, and entry.**

Potential Partners: **Aldo Leopold Wilderness Research Institute, Arizona State University, California State Parks, California State University at San Bernardino, California State Polytechnic University, San Luis Obispo, Oregon State University, National Park Service, Western Washington University**

Funding Requested: **\$415,000**

Team Leader: **James Absher/ Deborah Chavez/ Patricia Winter**

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Station: **RMRS**

Proposal code: **RMRS-MSO-19**

Topic(s): **D – i,ii**

Proposal title: ***Preventing residential fire disasters during wildland-urban interface (W-UI) fires.***

Other proposals to which this is linked: RMRS-MSO-4,5

RWU and location(s):

RMRS—4401, Fire Behavior, Missoula Fire Sciences Laboratory, Missoula, MT

Description:

- **Research or development question, issue, or need:**

The fire destruction of homes and the threat of residential fire destruction during wildland fires strongly impact homeowners, communities, and the ability to manage fire in vegetated landscapes. However, homes that do not ignite during a wildfire do not burn during a wildfire. The assessment and mitigation of W-UI home destruction depends on the ability to identify and understand those characteristics and processes that govern the potential for home ignition and thus fire destruction during wildfires. Effective mitigation of home ignition potential results in the possible occurrence of wildfires without having residential fire disasters, i.e., wildland fire compatible firewise homes and communities.

- **Research and development approach:**

Conduct research using experiments and modeling to enable improved identification and mitigation of those factors contributing to potential home ignitions given a wildfire exposure to flames and firebrands (lofted burning embers). Methods include: 1) Examination of home destruction and survival during wildfires that relate flame and firebrand exposures to materials and designs; 2) Field experiments exposing various exterior construction materials on full scale or near full scale structures to high intensity flame and firebrand exposures; 3) Laboratory experiments that determine specific ignition potential of materials and arrangements related to flame and firebrand exposures.

Develop operational tools enabling homeowners, community planners, and fire agencies to identify and thereby effectively and efficiently mitigate potential home ignitions during wildfires. Operational products include: Development of a method for generally assessing the potential W-UI fire threat (exposure) to communities due to landscape vegetative cover, severe weather occurrence and the degree of residential development; Improving existing methods for assessing potential home ignitions during wildfires (e.g., Structure Ignition Assessment Model); Development of a spatial model (GIS) that depicts the wildfire spread into a residential development and the resulting home destruction based on home ignition characteristics and spatial relations.

Outcomes or products:

- **First year:**
General area assessment method of W-UI fire threat (exposure).
- **Second year:**
Improved Structure Ignition Assessment Model and an associated guide for identifying housekeeping details for reducing home ignition potential.
- **Three to Five years out:**
Community wide WUI fire spread and home involvement model.
Recommendations of types of exterior building materials appropriate for various levels of flame and firebrand exposures.

Staffing needs by series and grade:

Existing: GS 1301-13, GS 460-13

New: GS 830-11/12, GS 401-11/12, GS 1301-9/11, GS 1311-7

Description of skills required:

The W-UI home ignition problem requires the same skills and general knowledge required for wildland fire behavior research: Wildland fuel and flame characteristics and heat transfer modeling; Fire and heat transfer experimental instrumentation and procedures; Spatial data analysis and modeling of propagating processes.

Potential Partners: University of Montana; Southern Research Station, USDA FS; R-3, R-5, USDA FS; Canadian Forest Service & Northwest Territories, Canada

Funding requested: \$500,000/year

Team Leader: Jack Cohen, Research Physical Scientist

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Station: **Pacific Southwest Research Station (PSW)**

Proposal Code: **PSW-4952-1**

Topic: **D-ii**

Proposal Title: **Alternative Prescriptions for Firewise Residential Landscapes**

Other Proposals to which this is Linked: **RMRS-MSO, PSW-4403-1, PSW-4355-2, PSW-4402-6.**

RWU: **PSW-4952, Western Center for Urban Forest Research and Education, Davis, CA**

Description:

Research or Development Question, Issue, or Need: **A growing number of residents are moving into the Wildland Urban Interface (WUI). The landscapes they create and manage influence the threat of residential fire destruction. These landscapes reflect deeply held values and lifestyle preferences that differ on a family by family basis. Fuel management prescriptions usually address the physical processes that govern fire spread and home ignition, but seldom consider expectations of residents for landscapes to provide beauty, privacy, recreation, views, wind shelter, sun, shade, wildlife habitat, etc. Research indicates that people are most motivated to increase fire safety when their actions preserve and enhance what they value in their landscapes. This finding suggests that instead of developing a single firewise condition for all landscapes, “custom” prescriptions are needed that respond to homeowners’ desires to retain native fuels, plant exotics, irrigate the landscape, and ensure privacy. Thus, there is need is to develop alternative prescriptions that can be used to match the physical structure of the mosaic landscape with residents attitudes about the look and care of their individual landscapes.**

Research and Development Approach: **Our research approach will involve the use of: 1) remote sensing and field sampling to characterize landscape structure, fuel, and moisture content; 2) household surveys to determine values and landscape maintenance practices; 3) on-site investigation of previous fires and modeling with SIAM and BEHAVE or FARSITE to initially identify 4 to 8 feasible prescriptions; 4) controlled burns to measure the effectiveness of each prescription; 5) model and prescription refinement based on field experiments; and 6) development of final prescriptions and transfer to federal, state, and local partners for implementation. Prescriptions will be performance based and use a maximum allowable home ignitability as a benchmark. We will work with FS scientists (Dr. Jack Cohen and others) and researchers at the University of California Forest Products Laboratory (Dr. Frank Beale, Richmond, CA) to establish this benchmark and incorporate the latest information on structural ignition and vegetation fire testing in the modeling process. The prescriptions will address tree protection and removal, plant selection and flammability, treatment of understory vegetation and ground covers, use of lawn and irrigation, clean-up of plant litter, disposition of green waste, pruning of deadwood from trees, and lifting of lower branches. The benefits and costs to homeowners**

will be calculated for each prescription with assistance from Dr. Madalene Ransom (State Economist, USDA NRCS, Davis, CA). We propose to conduct this research initially in the oak-woodland and ponderosa pine forests of the Sierra, and then extend it to other bioregions.

This RWU is uniquely positioned to extend the “urban perspective” to fire hazard issues at the WUI. We have applied remote sensing (AVIRIS), digital image analysis, and field sampling to describe the species composition, dimensions, biomass, and growth of open-grown trees in managed landscapes. With increased capacity our existing expertise in plant-environment interactions and benefit-cost analysis can be directed to solving problems at the UWI.

Outcome or Products: This research will result in a suite of scientifically tested fuel treatments and landscape design and management practices. Prescriptions will be easily implemented by homeowners and provide them with a spectrum of opportunities for engaging in firewise practices that simultaneously meet other needs and expectations.

First Year: Identify study sites and characterize existing conditions and homeowner attitudes.

Second Year: Develop initial prescriptions and model these with other researchers. Plan controlled burn experiments

Three to Five Years Out: Implement treatments and controlled burns, refine model and prescriptions. Develop and disseminate final prescriptions. Final products will include a CD-ROM for homeowners that illustrates how to implement the prescriptions, as well as web-based information and a pamphlet. Outreach will be accomplished in partnership with the California Department of Forestry and Fire Protection (Mr. Wayne Mitchell, Sacramento, CA).

Staffing Needs: Urban Forest Ecologist, GS-408/460-13, 1 full time GIS-Remote Sensing Expert GS-1300-12/13, and two full-time technicians (GS-7/9).

Description of Skills Required: The urban forest ecologist will have skills in forest ecology and management, urban forestry and geography, fire behavior and modeling. The GIS-remote sensing expert will have skills in GIS, remote sensing, forest ecology, and hydrology/watershed management.

Potential Partners: University of California Forest Products Lab

Funding Requested: \$500,000

Team Leader: Greg McPherson, Project Leader

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Station: SRS

Proposal code: SRS-4802-4

Topics(s): Di and Dii, Working with Communities, Social and Economics Systems and Fire-Safe Construction

Proposal title: The Development, Status, and Impact of Voluntary and Regulatory Fire Protection Programs in Wildlands Experiencing Residential Expansion

Other proposals to which this is linked: **SRS-4802-1, SRS-4802-3**

RWU (or Program or Team) and location(s): **SRS-RWU- 4802, New Orleans, LA**

Description:

Research or development question, issue, or need:

The risk for loss of life and property damages in fire-prone wildlands may be mitigated through aggressive public education and an effective mix of voluntary programs and regulatory controls. Allocations of firefighting dollars to protect lives and property in fire-prone wildlands has increased as exurbanites have developed communities or built second homes in fire-prone rural areas; these residents may have difficulty addressing potential dangers in their new environment that are not easily visualized, such as wildfire.

The purpose of this research is to explore the wide-range of regulatory, incentive-based and educational programs currently employed in fire-prone communities to mitigate the risk of catastrophic wildfires. The structure of these fire protection programs, their costs of implementation, and effectiveness will be analyzed to provide a body of knowledge which will be transferred to policymakers, planners, and fire protection officials to facilitate development of effective new programs in established and developing fire-prone communities.

Research and development approach:

State forestry agencies and fire councils will be contacted to identify high fire hazard areas that have experienced residential development. Four case study areas will be selected to represent the West, the Rocky Mountains, the North, and the South. The regulatory, incentive-based, and educational programs for managing residential expansion in these areas will be identified, and characterized in terms of structure, costs, and effectiveness in mitigating fire hazard. A wide-range of potential policy tools will be examined in each study area including: land use zoning, real estate transaction disclosure regulations, fire-safe building codes, landscape and vegetation management controls; insurance availability, costs, and requirements; regulations for conducting prescribed burns; and voluntary, incentive-based and educational programs.

Outcomes or products:

First year: A comprehensive assessment of the policy mechanisms employed in each of the four study areas will be developed in manuscript and database format. A website will be established to disseminate information from the database.

Second year: **Additional study areas will be identified and fire protection policy mechanisms assessed and documented on the existing website database. .**

Three to Five years out: **Methodology for overlaying census demographic data on mapped data depicting hazardous fuels accumulations will be explored as a tool to identify fire-prone communities. The Forest Service is currently developing these fuel hazard maps. Localities at risk for wildfire will be identified. Fire protection programs in these areas will be evaluated as in the first and second years of the study. Community leaders, policymakers, planners, and fire protection officials in the identified fire-prone areas will be apprised of the materials that have been developed. Assistance to these communities will be provided if requested in developing fire-safe policies and programs.**

Staffing needs by series and grade: **A team of two GS-11 research scientists, one forester and one planner, and one GS-9 computer specialist. One additional GS-11 research forester or computer specialist familiar with GIS systems for the fourth and fifth years.**

Description of skills required: **Familiarity with forest practices and forest policy; real estate, insurance, zoning, and development regulations; and website development, database management, and GIS systems.**

Potential Partners (universities, federal agencies and labs, national forests, states, private companies, etc):

Funding requested: **\$250,000 annually for three years, then \$350,000 for two additional years.**

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